



# Abusive head trauma: two case reports

Ali Kanık, Osman Tolga İnce, Şehriban Yeşiloğlu, Kayı Eliaçık, Ali Rahmi Bakiler

Clinic of Pediatrics, The Ministry of Health İzmir Tepecik Training and Research Hospital, İzmir, Turkey

## Abstract

Abusive head trauma is a serious form of child abuse and mostly seen in infants below the age of two years as a result of a strong shaking by the caregiver who aims to stop the infant's crying. Characteristic symptoms include subdural hematomas, encephalopathy, retinal hemorrhages and fractures of the long bones. When physically examined, there are generally no externally visible signs. For this reason, it can be underdiagnosed, if it is not considered in the differential diagnosis. When the information provided from the parents is inconsistent and contradictory with the clinical picture of the patient, this form of abuse must be suspected and retinal hemorrhages should be searched. In this article, two patients who were admitted to our emergency department and diagnosed with physical child abuse are reported. One of these patients had a history of minor head trauma after falling down from the sofa and the other one had a history of breathlessness and loss of consciousness as a result of excessive crying. (Turk Pediatri Ars 2015; 50: 180-4)

**Keywords:** Child abuse, head trauma, retinal hemorrhage

## Introduction

Abusive head trauma (AHT) is a serious form of physical abuse which occurs as a result of strong shaking by the caregiver who aims to stop the infant's crying accompanied by intracranial and retinal hemorrhages (1, 2). Although it is frequently observed in children aged below two years, it may occur up to the age of five years. Abusive head trauma may not cause to any clinical finding or may be manifested with clinical pictures necessitating intensive care or even leading to death.

The reasons of presentation in children with abusive head trauma generally include restlessness, stupor, vomiting, seizure, apnea, poor feeding and coma. On physical examination, only fundoscopic examination findings may have a significance. In addition, eggshell fracture in the posterior rib and cranium are the other findings suggesting AHT. While the prevalence is 1-10% in the world, the number of cases reported is very few in Turkey (2, 3). For making the diagnosis, suspicion and detailed examination are crucial.

In this article, two patients who were referred to our hospital (one with fainting following falling down from sofa and the other one with cyanosis and loss of consciousness following crying) and were diagnosed with abusive head trauma after investigations performed are presented.

## Case 1

A six-month old girl who was learned to be healthy previously was referred to our hospital from the hospital where she was brought with loss of consciousness following falling down from sofa which lasted for 10 minutes, because her general status was poor. On the initial physical examination, her general status was moderate, the vital signs were within the normal limits and Glasgow coma score (GCS) was found to be 13. Examination of the other systems were found to be normal and no sign of trauma was found on the body. In the follow-up, clouding of consciousness continued and hyperdense appearances compatible with subarachnoid hemorrhage (SAH) were found in the sulci more prominent in the left brain hemisphere and vertex level on computerized tomogra-

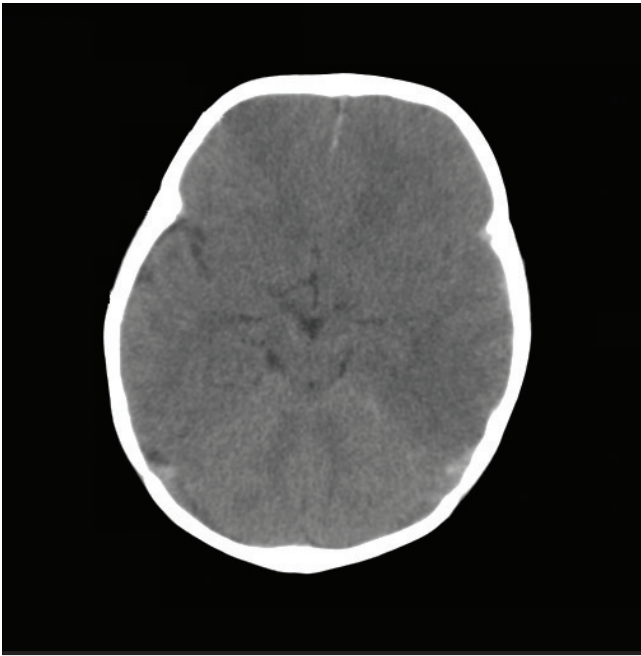
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**Address for Correspondence:** Kayı Eliaçık, Sağlık Bakanlığı İzmir Tepecik Eğitim ve Araştırma Hastanesi, Çocuk Sağlığı ve Hastalıkları Kliniği, İzmir, Türkiye. E-mail: kayieliacik@gmail.com

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**Figure 1.** Diffuse brain edema. Hyperdense appearance compatible with subarachnoid hemorrhage in the vertex level in bilateral occipitoparietal region and left temporoparietal area

phy (CT) of the brain. In addition, hyperdense appearance compatible with subdural hemorrhage was observed in the interhemispheric fissure and tentorium level. Sulcal effacement, reduced white-grey matter distinction and asymmetrical hypodense appearance were present in the left brain hemisphere (Figure 1). The patient whose GCS regressed to eight was internalized in the pediatric intensive care unit with a diagnosis of trauma-related SAH and subdural hemorrhage. Surgical intervention was not considered. Recurrent generalized seizures were observed. Complete blood count, prothrombin time (PT), activated partial thromboplastin time (aPTT) and fibrinogen level were measured in terms of congenital bleeding disorder and found to be normal. On repeated CT of the brain, similar findings persisted. The hypodense appearance in the left frontotemporoparietal area became more prominent. Mild compression in the left lateral ventricle and shifting of the middle line to the left (approximately 2-3 mm) were found in relation with mass effect due to bleeding which was different from the previous CT. Antiedema treatment was administered and surgical intervention was not considered. Seizures did not recur during the follow-up period which lasted for one month and his general status improved completely.

Because the findings at presentation and the history were contradictory, fundoscopic examination was performed considering abusive head trauma and retinal bleeding foci were found in both eyes. The pa-

tient was reevaluated with this new finding and the graphies of the patient revealed fracture in the right clavicle which completed formation of callus. With these radiological findings it was thought that trauma which caused the fracture occurred more than one month ago. Therefore, the differential diagnosis of abuse and birth trauma could not be made exactly for clavicle fracture.

In the history taken from the mother, it was learned that the family had a low socioeconomical level, the patient had two healthy siblings and domestic violence was occasionally experienced at home. The mother insisted that the child fainted after falling down from sofa and all this situation was related with falling. The contradictory answers of the mother and the fact that she did not comprehend some questions and could not be communicated easily suggested that the reliability of the information obtained from the mother was low. The father could not be interviewed during the follow-up in the hospital. The case was reported to social service experts and children police and the necessary legal procedure was initiated. The physician views were reported directly to the prosecution office in accompaniment of the findings. The examination performed by social service experts revealed that the parents were lacking social support and could not predict the negative effects of shaking on the child. It was learned that it was decided to provide social support to the parents, to let the child stay with them and to follow-up the family. At the one-year outpatient follow-up visit, it was observed that the event did not recur and the neuromotor development was compatible with her age.

## Case 2

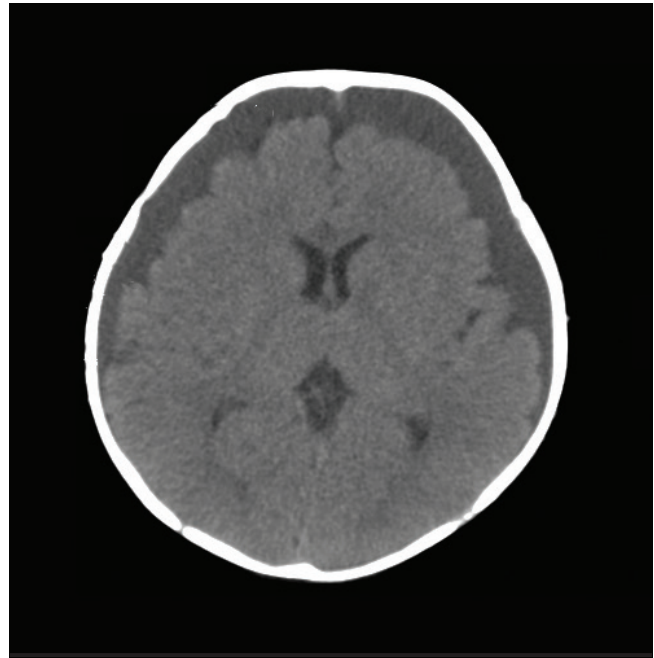
A four-month old male patient was referred to our hospital from another hospital where he presented because of seizure, stupor and poor general status. The initial evaluation revealed moderate general status, normal vital signs, agitation, poor light reflex in both eyes and ecchymosis on both cheeks in the form of bite (Figure 2). Examination of the other systems was found to be normal. Complete blood count, bleeding-coagulation variables and biochemical variables were found to be normal. Computerized tomography of the brain performed because of seizure and stupor revealed appearances compatible with SAH in the right and left parietal lobes and subdural collection was observed in both hemispheric convexity (Figure 3). Fundoscopic examination revealed epiretinal bleeding covering the posterior pole including both maculae and multiple subreti-



**Figure 2. Bite marks on the cheek**

nal bleeding foci in the peripheral retina. Abusive head trauma was considered with these findings. Graphies of the whole body were obtained. No additional pathology was found.

The sociodemographic history of the family was taken in a more detailed way. It was learned that the patient was the only child of the family and the family newly migrated from another city to find a job. In the interview conducted with the mother, it was learned that the patient cried frequently, the father was unemployed and staying at home, he sometime took the baby in his lap and shook him to make him stop crying. The father reported that he shook the baby when he cried and used violence against his wife and his wife's mother who was living in the same house. As in the first case, social service experts were called and the necessary legal procedure was initiated. With the decision of the prosecution office, the mother was taken to a women's shelter and the baby was put under protection. A criminal action was brought against the father. The patient who is 20-month old at the present time is being brought for regular follow-up visits. He has age-appropriate growth and development and no neurological sequela.



**Figure 3. Diffuse subdural effusion, hyperdense appearance which may be primarily compatible with subarachnoid hemorrhage in the vertex**

## Discussion

Definitions including “battered child syndrome”, “shaken baby” and “shaken baby syndrome” are used to describe physical abuse resulting in brain and head injury in children (1). Since these terms define only one event, it has been recommended to use the term “abusive head trauma” in the literature (4). The prevalence of abusive head trauma has been reported to be 17/100 000 in USA (1). Although no epidemiological research related with the prevalence in our county has been conducted yet, the gradual increase in the case reports suggests that this problem may be more frequent than defined in our country (2, 3).

Many factors play a role in child abuse. Although it is observed in all socioeconomical groups, it is more common in families with a low socioeconomical level (5). The main risk factors include low income level, personality disorder in the parents, substance addiction, history of abuse, unhappy marriage and being parents at a young age. Since generally mothers are responsible to take care of children, they are involved in abuse with a higher rate compared to men. However, fathers who spend more time at home because of unemployment reverse this statistics (6). In both cases in this article, the very low socioeconomical level of the family, unemployed fathers and domestic violence were notable.

Diagnosis in cases of AHT is only possible by suspicion and detailed physical examination, laboratory investigations and imaging methods confirming the diagnosis. Presence of contradiction between the clinical findings on physical examination and the history proposed by the family, inability to obtain detailed history from the family, accusing each other in the family, contradictory and continuously changing history and late presentation to hospital should suggest the possibility of abuse and neglect (7). In our cases, suspicious history and accusation of the father by the mother especially in the second case suggested the possibility of abuse.

The possibility of being abused is high in “difficult” babies who cry frequently and intensively. Unstoppable crying of the baby may lead to anxiety in the parents who can not understand why the baby is crying and who do not know how to behave and make them shake the baby (2). To prevent cases of abusive head trauma physicians should explain parents who have newly had a baby that shaking may harm the baby during counselling education. It has been reported that such type of counselling trainings given to mothers in hospitals in USA have reduced AHT by 47% (8). In another study conducted in Turkey, it was observed that mothers who received breastfeeding counselling received more support from their husbands and mother-in-laws for the care of their babies and the frequency of child abuse was lower in these families (9). In our second case, there was a history of shaking because of frequent and prolonged crying of the baby.

Brain imaging is recommended even in the absence of clinical findings specific for head trauma in all babies aged below one year with facial injury, rib fracture or multiple fractures and in all babies aged below six months with any evidence of physical abuse (2). Although there is no pathognomonic type of fracture for child abuse, some fractures show a high specificity for abuse. These include metaphysial or epiphysial fractures (bucket handle or corner fractures), posterior rib fractures, multiple or complex skull fractures and fractures for which no medical attention has been sought (10). In our first case, there was an old clavicle fracture with callus formation and this did not directly lead to the diagnosis.

Children who have been abused are usually not diagnosed or appropriate approach can not be conducted

even if they are diagnosed. The most important reason for this is lack of information in this area. Parents generally deny the event of abuse. The reason of delayed diagnosis in the first case was the fact that the parents insisted on denying the event and the physicians who made the initial assessment in the emergency department thought that the event might be related with trauma described by the parents. Accidents in daily life during infancy (for example, falls from a height of <150 cm), generally do not lead to serious injury. Serious head traumas are generally observed following falls from a height or in-vehicle accidents due to high speed. Even in these accidents, the possibility of retinal bleeding is less than 3% (11). Since ophthalmological findings are significant in the diagnosis, fundoscopic examination should be a part of evaluation especially in young children presenting with head trauma. In addition, there is mostly no apparent injury on the skin of the head on inspection in cases of AHT as in our two cases. In the literature, it has been reported that subarachnoid and subdural hemorrhage is very rare after mild head traumas (2, 12). In the first case described in this article, fundoscopic examination was performed, because there was contradiction between trauma described in the history and clinical findings and cranial CT findings and the diagnosis of abuse was confirmed.

There are two important issues for which the physician should make a decision in children presenting to emergency departments with head trauma. The first one is determining which patients are risky in terms of brain damage when evaluating physical examination and history and deciding for further investigations and treatment. The second is to decide which children should be suspected in terms of abuse and intervened in this aspect (11). Abusive head trauma is a condition which should be rapidly recognized by physicians working in pediatric emergency departments and which should be managed appropriately. Increasing the trainings in this area in our country is very important to diagnose these cases in time and treat them appropriately and efficiently.

Pediatricians are obliged to report the crime when they confront with a case of child abuse after completing the patient’s treatment. Multidisciplinary approach is essential when child abuse is suspected. With this objective, hospital child protection units composed of social pediatricians, forensic medicine specialists, child and

adolescent psychiatrists, social service experts, psychologists and pediatric surgeons should be established (11).

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